



**ANALYSIS OF TRACE PAH IN WATER SAMPLES
FROM THE CITY OF ST. LOUIS PARK, MN
GAC TREATMENT PLANT**

**ERT Project No. 0005-192
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**Prepared for
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ANALYSIS OF TRACE PAH IN WATER SAMPLES
FROM THE CITY OF ST. LOUIS PARK, MN
GAC TREATMENT PLANT

INTRODUCTION

This report represents the results of analysis conducted on various water samples received by the ERT Analytical Chemistry Laboratory on July 31, 1986. The samples were to be analyzed for selected polyaromatic hydrocarbons (PAH) and heterocycles.

SAMPLE RECEIPT AND CHAIN OF CUSTODY

Routine inspection of the samples revealed them to be packaged properly and received in good condition.

Upon receipt, information from the submitted samples was recorded in the Master Log Book (and the LIMS computer system) and assigned ERT Control Numbers. These unique sample labels were affixed to respective sample containers and subsequently utilized throughout the laboratory analysis procedures for positive traceability.

ANALYTICAL PROCEDURES

The water samples were analyzed according to procedures as outlined in: ERT Standard Analytical Method (SAM) #020-6 "Analytical Method for Low-level PAH and Heterocycles in Water", as provided in the Quality Assurance Project Plan for Sampling and Analysis - GAC Plant Testing, June-August, 1986, ERT Document No. P-D209-129-1, July, 1986.

QUALITY CONTROL PROCEDURES

Quality control procedures as described in the Quality Assurance Project Plan for Sampling and Analysis - GAC Plant Testing, June-August, 1986, ERT Document No. P-D209-129-1,

July, 1986 were implemented for all analyses. Laboratory method (reagent) blanks, laboratory solvent blanks, laboratory duplicated samples, and laboratory method spike (fortified control) samples were analyzed concurrently with the submitted samples based on the following frequency:

- a) Laboratory method blank, 5% - one for every (20) samples submitted.
- b) Laboratory solvent blank, 10% - one for every (10) samples submitted.
- c) Laboratory method spikes, 5% - one for every (20) samples submitted.

All samples and quality control samples were fortified prior to extraction with selected deuterated PAH surrogate compounds, i.e., naphthalene-d₈, fluorene-d₁₀, and chrysene d-₁₂, at a sample concentration level of approximately 10 ng/l (ppt). The following criteria, based on percent recovery, was to be utilized for the determination of data validity for each sample:

<u>Surrogate</u>	<u>Minimum Mean (%)</u>	<u>Mean (%)</u>	<u>Standard Deviation (%)</u>	<u>95% Confidence Limits</u>
Naphthalene-d ₈	42	72	15	42-102
Fluorene-d ₁₀	60	94	17	60-128
Chrysene-d ₁₂	20	30	12	10-54

Various corrective action steps, as described in the QA plan, were to be initiated whenever the recovery of any one surrogate is found to be below the 95% confidence limit.

RESULTS OF ANALYSIS

The sampling report, analytical results report, the method spike recovery report, and the surrogate recovery report are presented in the attached tables.

No problems were encountered during sample extractions and analyses.

DISCUSSION

A review of naphthalene-d₈, surrogate recoveries indicated that one (1) of the submitted samples was below the 95% confidence interval of 42-102%:

<u>Field Identification</u>	<u>ERT Number</u>	<u>Naphthalene-d₈ % Recovery</u>
F-03	37136	16

The mean recovery for the naphthalene-d₈ surrogate in the samples submitted from the GAC site, including the laboratory method blank and method spike was found to be 49.1%. This value was above the minimum mean value of 42%.

Various corrective action steps, including review of calculations, examination of internal standard and surrogate solutions for degradation and contamination, and an instrument performance check, were performed. These steps did not provide any conclusive insight or explanation for the apparent low recovery of the naphthalene-d₈ surrogate.

In addition, it should be noted that the analytical results for the method spike recovery sample for the eight (8) selected compounds were found to be within the method spike criteria for data validity, except for benzo (g,h,i) perylene which was 4.0% (rather than 10%). However, the average recovery for the target compounds was 46%, within the 20%-150% target range.

The ERT Analytical Laboratory does not feel that the naphthalene-d₈, surrogate recovery (42%) for the one (1) sample compromises the validity of the data as reported. Based on the recovery of the selected PAH compounds in the method spike (matrix fortification) sample, the method is capable of identifying and quantifying the compounds to be analyzed utilizing this analytical method.

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
CITY OF ST. LOUIS PARK, MN**

ppt ANALYSIS OF PAH IN WATER

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	T-03
2. ERT SAMPLE NUMBER:	37135
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/05/86
7. DATE ANALYZED:	8/20/86
8. GC/MS FILE #:	37135A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP10
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 17
15. COMMENTS:	NA = NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	F-03
2. ERT SAMPLE NUMBER:	37136
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/05/86
7. DATE ANALYZED:	8/20/86
8. GC/MS FILE #:	37136A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP10
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 17
15. COMMENTS:	NA - NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	B-03
2. ERT SAMPLE NUMBER:	37137
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/5/86
7. DATE ANALYZED:	8/20/86
8. GC/MS FILE #:	37137A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP10
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 17
15. COMMENTS:	NA = NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	TD-03
2. ERT SAMPLE NUMBER:	37138
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/5/86
7. DATE ANALYZED:	8/19/86
8. GC/MS FILE #:	37138A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP09
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 16
15. COMMENTS:	NA = NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	W-03
2. ERT SAMPLE NUMBER:	37139
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/05/86
7. DATE ANALYZED:	8/19/86
8. GC/MS FILE #:	37139A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP09
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 16
15. COMMENTS:	NA = NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	MS-03
2. ERT SAMPLE NUMBER:	37140
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	7/30/86
5. DATE RECEIVED:	7/31/86
6. DATE EXTRACTED:	8/5/86
7. DATE ANALYZED:	8/19/86
8. GC/MS FILE #:	37140A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP09
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 16
15. COMMENTS:	NA = NOT AVAILABLE

**ERT ANALYTICAL LABORATORY
SAMPLING REPORT
POLYAROMATIC HYDROCARBONS**

1. FIELD IDENTIFICATION:	MB860569
2. ERT SAMPLE NUMBER:	37286
3. FIELD LOGBOOK/PAGE NUMBER:	NA
4. SAMPLING DATE:	NA
5. DATE RECEIVED:	NA
6. DATE EXTRACTED:	8/05/86
7. DATE ANALYZED:	8/19/86
8. GC/MS FILE #:	37286A
9. GC/MS TAPE #:	MSD1
10. CORRESPONDING DFTPP FILE #:	DFTPP09
11. CORRESPONDING MATRIX SPIKE SAMPLE:	ERT # 37140
12. CORRESPONDING METHOD BLANK SAMPLE:	ERT # 37286
13. CORRESPONDING SOLVENT BLANK SAMPLE:	ERT # 37489
14. CORRESPONDING GC/MS CALIBRATION FILE #:	STD 16
15. COMMENTS:	NA = NOT AVAILABLE

ERT ANALYTICAL LABORATORY
ANALYTICAL RESULTS REPORT
CITY OF ST. LOUIS PARK, MN

ppt ANALYSIS OF PAH IN WATER

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS

FIELD ID: T-03

ERT NO.: 37135

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	ND
BENZO (A) ANTHRACENE	ND
CHRYSENE	ND
BENZOFUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	ND

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROINDENE	ND
INDENE	ND
NAPHTHALENE	ND
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	ND
1-METHYLNAPHTHALENE	ND
DIPHENYL	ND
ACENAPHTHYLENE	ND
ACENAPHTHENE	ND
DIBENZOFURAN	ND
FLUORENE	ND
DIBENZOTHIOPHENE	ND
PHENANTHRENE	ND
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	ND
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	ND
TOTAL PAH'S	ND

ND = Concentration < 95% Confidence Interval of MDL

**ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS**

FIELD ID: F-03

ERT NO.: 37136

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	4.3
BENZO (A) ANTHRACENE	4.5
CHRYSENE	4.4
BENZOFLUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	8.8

OTHER PAH'S

2,3-BENZOFURAN	2.9
2,3-DIHYDROINDENE	370
INDENE	20
NAPHTHALENE	ND
BENZO (B) THIOPHENE	120
INDOLE	ND
2-METHYLNAPHTHALENE	ND
1-METHYLNAPHTHALENE	23
BIPHENYL	18
ACENAPHTHYLENE	620
ACENAPHTHENE	900
DIBENZOFURAN	420
FLUORENE	730
DIDENZOTHIOPHENE	95
PHENANTHRENE	100
ANTHRACENE	130
ACRIDINE	38
CARBAZOLE	23
FLUORANTHENE	350
PYRENE	300
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	4260
TOTAL PAH'S	4269

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS

FIELD ID: B-03

ERT NO.: 37137

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	ND
BENZO (A) ANTHRACENE	ND
CHRYSENE	ND
BENZOFLUORANTHENE	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	ND

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROINDENE	ND
INDENE	ND
NAPHTHALENE	ND
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	ND
1-METHYLNAPHTHALENE	ND
BIPHENYL	ND
ACENAPHTHYLENE	ND
ACENAPHTHENE	ND
DIBENZOFURAN	ND
FLUORENE	ND
DIBENZOTHIOPHENE	ND
PHENANTHRENE	ND
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	ND
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	ND
TOTAL PAH'S	ND

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS

FIELD ID: TD-03

ERT NO.: 37138

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	ND
BENZO (A) ANTHRACENE	ND
CHRYSENE	ND
BENZOFLUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	ND

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROINDENE	<3.4
INDENE	ND
NAPHTHALENE	ND
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	ND
1-METHYLNAPHTHALENE	ND
BIPHENYL	ND
ACENAPHTHYLENE	<1.7
ACENAPHTHENE	<1.3
DIBENZOFURAN	ND
FLUORENE	ND
DIBENZOTHIOPHENE	ND
PHENANTHRENE	ND
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	ND
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	ND
TOTAL PAH'S	ND

ND = Concentration < 95% Confidence Interval of MDL

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS

FIELD ID: W-03

ERT NO.: 37139

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	ND
BENZO (A) ANTHRACENE	ND
CHRYSENE	ND
BENZOFLUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	ND

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROIISENE	15
INDENE	ND
NAPHTHALENE	ND
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	ND
1-METHYLNAPHTHALENE	ND
BIPHENYL	ND
ACENAPHTHYLENE	12
ACENAPHTHENE	17
DIBENZOFURAN	2.0
FLUORENE	6.3
DIBENZOTHIOPHENE	ND
PHENANTHRENE	ND
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	5.4
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	58
TOTAL PAH'S	58

**SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS.**

FIELD ID: MS-03

ERT NO. 37140

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	18
BENZO (A) ANTHRACENE	ND
CHRYSENE	12
BENZOFLUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	30

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROINDENE	4.1
INDENE	10
NAPHTHALENE	56
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	10
1-METHYLNAPHTHALENE	ND
BIPHENYL	ND
ACENAPHTHYLENE	ND
ACENAPHTHENE	1.5
DIBENZOFURAN	ND
FLUORENE	17
DIBENZOTHIOPHENE	ND
PHENANTHRENE	ND
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	ND
BENZO (E) PYRENE	4.0
PERYLENE	ND
TOTAL OTHER PAH	100
TOTAL PAH'S	130

ND = Concentration (95% Confidence Interval of MDL.

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
POLYAROMATIC HYDROCARBONS

FIELD ID: MB860569

ERT NO.: 37286

CARCINOGENIC PAH'S

PARAMETERS	ANALYTICAL RESULT (NG/L)
QUINOLINE	ND
BENZO (A) ANTHRACENE	ND
CHRYSENE	ND
BENZOFLUORANTHENES	ND
BENZO (A) PYRENE	ND
INDENO (1,2,3-CD) PYRENE	ND
DIBENZ (A,H) ANTHRACENE	ND
BENZO (G,H,I) PERYLENE	ND
TOTAL CARCINOGENIC PAH	ND

OTHER PAH'S

2,3-BENZOFURAN	ND
2,3-DIHYDROINDENE	ND
INDENE	ND
NAPHTHALENE	<47
BENZO (B) THIOPHENE	ND
INDOLE	ND
2-METHYLNAPHTHALENE	<5.0
1-METHYLNAPHTHALENE	<3.1
BIPHENYL	ND
ACENAPHTHYLENE	ND
ACENAPHTHENE	ND
DIDENZOFURAN	1.2
FLUORENE	2.1
DIBENZOTHIOPHENE	ND
PHENANTHRENE	11
ANTHRACENE	ND
ACRIDINE	ND
CARBAZOLE	ND
FLUORANTHENE	ND
PYRENE	ND
BENZO (E) PYRENE	ND
PERYLENE	ND
TOTAL OTHER PAH	14
TOTAL PAH'S	14

ND = Concentration < 95% Confidence Interval of MDL

ppt PAH ANALYSIS IN WATER

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
QUALITY CONTROL CHECK SAMPLES
POLYAROMATIC HYDROCARBONS

FIELD ID: MS-03

ERT NO.: 37140

PARAMETERS	SPIKE LEVEL (NG/L)	% RECOVERY
NAPHTHALENE	110	51
FLUORENE	21	81
CHRYSENE	24	50
BENZO (G,H,I) PERYLENE	22	4.0
INDENE	25	40
QUINOLINE	24	75
BENZO (E) PYRENE	20	20
2-METHYLNAPHTHALENE	21	48
AVERAGE % RECOVERY		46

AVERAGE % RECOVERY TARGET RANGE = 20%-150%

ERT ANALYTICAL LABORATORY
SURROGATE RECOVERY REPORT
CITY OF ST. LOUIS PARK, MN

ppt PAH ANALYSIS IN WATER

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: T-03

ERT NO.: 37135

<u>SURROGATE</u>	<u>SPIKE LEVEL (NG/L)</u>	<u>% RECOVERY</u>	<u>95% CONFIDENCE LIMITS (%)</u>
NAPHTHALENE - D8	9.9	42	42-102
FLUORENE - D10	9.3	125	60-128
CHRYSENE - D12	9.8	43	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: F-03

ERT NO.: 37136

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	✓16	42-102
FLUORENE - D10	9.5	✓138	60-128
CHRYSENE - D12	9.8	21	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: B-03

ERT NO.: 37137

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	54	42-102
FLUORENE - D10	9.5	✓138	60-128
CHRYSENE - D12	9.8	✓68	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: TD-03

ERT NO.: 37138

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	58	42-102
FLUORENE - D10	9.5	✓147	60-128
CHRYSENE - D12	9.8	44	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: W-03

ERT NO.: 37139

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	65	42-102
FLUORENE - D10	9.5	✓166	60-128
CHRYSENE - D12	9.8	37	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: MS-03

ERT NO.: 37140

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	64	42-102
FLUORENE - D10	9.5	✓145	60-128
CHRYSENE - D12	9.8	47	10-54

ERT ANALYTICAL LABORATORY
SUMMARY OF ANALYTICAL RESULTS
SURROGATE RECOVERY REPORT
POLYAROMATIC HYDROCARBONS

FIELD ID: MB860569

ERT NO.: 37286

SURROGATE	SPIKE LEVEL (NG/L)	% RECOVERY	95% CONFIDENCE LIMITS (%)
NAPHTHALENE - D8	9.9	45	42-102
FLUORENE - D10	9.5	116	60-128
CHRYSENE - D12	9.8	83	10-54

environmental and engineering excellence

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